WHAT IS CLAIMED IS

1. A method of production of a scanning probe microscope probe provided with a sharp head made of a single wall carbon nanotube, said method comprising imparting a catalyst metal to a tip of a probe body, then irradiating the catalyzed part of the tip of the probe body by an arc discharge caused across fine needle shaped carbon electrodes in an inert gas atmosphere in the scanning probe microscope so as to cause growth of a single wall carbon nanotube at said catalyzed part.

2. A method of production as set forth in claim 1, wherein an anode of said fine needle shaped carbon electrodes contains a catalyst metal.

3. A method of production as set forth in claim 1 or 2, further comprising using the single wall carbon nanotube in the middle of growth at the tip of said probe body to scan a nanometer order step difference on a sample surface, finding a length of said single wall carbon nanotube based on a sharpness of an obtained step difference image, and stopping said arc discharge to stop growth of said single wall carbon nanotube when reaching a required length.

4. A method of production as set forth in claim 3, further comprising holding said sample with a step difference on a forced cooling stage.

5. A method of production of a scanning probe microscope probe provided with a sharp head made of a single wall carbon nanotube, said method comprising imparting a catalyst metal to a tip of a probe body, then alternately irradiating the catalyzed part of the tip of said probe body by an arc discharge caused across fine needle shaped carbon electrodes and a laser beam while rotating it at a high speed about an axis perpendicular to its length direction in an inert atmosphere so as to grow a single wall carbon nanotube at said catalyzed part at the time of irradiation by arc discharge and sequentially monitor growth of the single wall carbon

nanotube by Raman spectroscopy at the time of irradiation by the laser beam.

6. A method of production as set forth in claim 5, further comprising blowing a small amount of oxidizing gas to the single wall carbon nanotube being grown at the time of irradiation by said arc discharge so as to burn off a tip cap of said single wall carbon nanotube for further sharpening.

7. A method of production as set forth in claim 6, wherein said oxidizing gas includes at least one type of gas selected from CO_2, CO, H_2O, H_2O_2, and CH_3OH.

8. A method of inspection of a probe produced by a method as set forth in any one of claims 1 to 7, comprising using said probe to scan a nanometer order step difference on a sample surface and finding a bearing of growth of the single wall carbon nanotube forming the sharp head of said probe based on an angle and bearing of deviation of the obtained step difference image from the actual shape.

9. A method of use of a probe for which a bearing of growth of the single wall carbon nanotube is found by the method of inspection of claim 8 in a scanning probe microscope, said method comprising tilting a sample stage in accordance with said bearing of growth so as to make a direction of the probe sharp head made of the single wall carbon nanotube perpendicularly intersect with the sample surface.

10. A method of use as set forth in claim 9, further comprising tilting said sample stage by three actuators able to be independently controlled.